(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
3 June 2004 (03.06.2004)

PCT

(10) International Publication Number
WO 2004/045943 A1

(51) International Patent Classification[7]: B62K 15/00, 5/04

(21) International Application Number:
PCT/NO2003/000389

(22) International Filing Date:
20 November 2003 (20.11.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
20025584 21 November 2002 (21.11.2002) NO

(71) Applicant *(for all designated States except US)*: PETER OPSVIK AS [NO/NO]; Pilestredet 27 H, N-0164 Oslo (NO).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: OPSVIK, Peter [NO/NO]; Josefines gate 40, N-0258 Oslo (NO).

(74) Agent: OSLO PATENTKONTOR AS; Postboks 7007 M, N-0306 Oslo (NO).

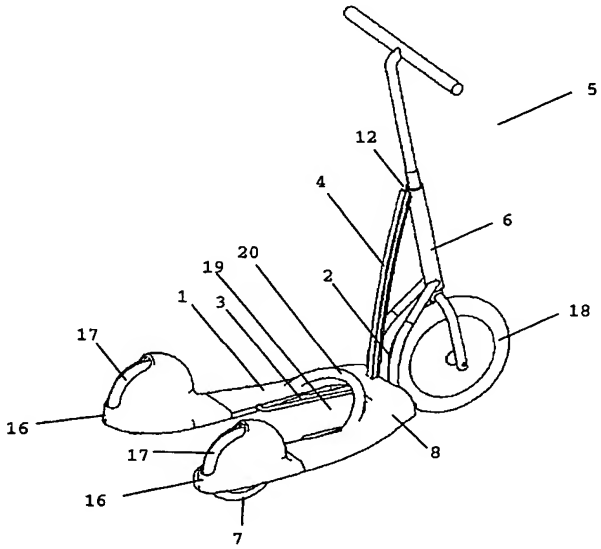
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: MEANS OF PERSONAL TRANSPORT



(57) Abstract: The invention relates to a foldable scooter (5) comprising a support device (6) for a steerable front wheel and a rear carriage (1). The carriage is connected to the support device (6) at the front of the carriage (1), which carriage (1) is provided with at least one wheel (7) at the rear. The carriage (1) may be folded against the support device (6) to form a compact unit which may be carried or wheeled. In an expanded position of the scooter, the front of the said carriage (1) abuts a stop face (9) connected to the support device (6). Further, a rigid stay (3) is connected to the carriage (1), which stay (3) is pivotally connected at its first end (10) to a mid-section of the carriage (1) and is pivotally connected at its opposite end (11) to the support device (6).

WO 2004/045943 A1

Means of personal transport

Technical field

The present invention relates to vehicles comprising three wheels designed as a scooter which may be transformed into a compact and trolley-like compartment unit.

Background art

The scooters of prior art are generally not well adapted to situations where conventional use (propulsion by kicking) is not acceptable or impossible. Accordingly, the need for transportation of goods which often accompanies personal transportation is not often in focus.

The invention relates to a technical solution where a vehicle for personal transport (corresponding to a traditional scooter) may be transformed into a compact and trolley-like compartment unit (corresponding to a traditional suitcase with wheels) which may be handled and is acceptable outside the intended field of application for a scooter.

The traditional scooter must often be carried in situations where it can not be used, e.g. during travel by public transport. This will in spite of a compact design be impractical.

In the embodiment disclosed in the present application, the vehicle comprises three wheels, which makes it possible for a stable ride at low velocity. Corresponding two-wheeled scooters will be more unstable at low velocity.

Several examples of collapsible, wheeled devices are known. One example of a collapsible, wheeled device is disclosed in US 3,434,558. The device is collapsible in that a pair of wheels of the said device can be pushed towards a third wheel guided by a stabilizing sway bar. The device is col-

lapsed by use of both hands, and the design of the stabilizing sway and the platform makes it difficult to transport this vehicle in a collapsed position.

EP 1213214A2 discloses a collapsible tricycle of which the framework mainly comprises tubes. Furthermore, the scooter is folded together with a folding mechanism disposed between the different tube members. The folding mechanisms are relatively complex constructions which comprise several small parts.

US 6220612 also disclose a foldable tricycle. This tricycle is folded together by lowering the front part via a joint located at the connection between the rear and the front part of the cycle, leaving the tricycle in a collapsed position with all parts in substantially one plane with the front and the rear wheels at each end.

De 3537522 A1 discloses a scooter where the steering rod may be folded down onto the main part comprising a platform and wheels.

A foldable tricycle is also disclosed in DE 3138095 A1. Said tricycle comprises three wheels and may be folded together and transported on the wheels in a collapsed position. The described design requires that the platform is divided and can be folded. The folding of the tricycle is done using both hands. Further the tricycle is free to roll on the wheels in a folded position which is a disadvantage when the device is left unattended on a sidewalk or the like.

Brief description of the invention

An object of the present invention is to provide a scooter comprising three wheels which can be folded using one hand only.

A second object of the invention is to provide a scooter which can be carried or wheeled in a folded position like a wheeled suitcase. Compartment units may be attached to the handlebar construction as to make the scooter work like a wheeled suitcase.

A third object of the invention is to provide a scooter which may be left unattended without the risk of the folded scooter moving unintentionally.

A further object of the invention is to provide a scooter which has a rigid platform construction.

Yet another object of the invention is to provide a scooter which accommodates motorized propulsion.

The invention may function as a hybrid, hence, as a compartment unit (briefcase, suitcase, shopping bag, etc.) and/or a means of transportation in one compact and manageable unit, which will be just as acceptable to bring indoors as a wheeled briefcase.

The objects of the invention are accomplished by a scooter comprising a support device for a steerable front wheel, and a rear carriage which is connected to the support device at the front of the carriage, which carriage is provided with at least one wheel at the rear, the carriage may be folded against the support device forming a compact unit which may be carried or rolled, wherein in a utilizing position, the front of said carriage rests against a stop face connected to the support device, and a rigid stay which is pivotally connected at its first end to a midsection of the carriage and is pivotally connected at its second end to the support device; when the scooter is collapsed, the carriage will pivot around the first end of the stay, and the rear wheel or wheels is swung towards the front wheel, as claimed in the appended claim 1. Further

advantageous embodiments of the invention will appear from the following dependent claims.

Brief description of the drawings

A preferred embodiment of the present invention is described in detail with reference to the enclosed drawings, where;

Figure 1 is a perspective view of a scooter according to the invention mounted in a position for personal transportation,

Figure 2 is a perspective view of a rigid stay which is pivotally connected to the rear carriage and the support device,

Figure 3-5 are perspective views with corresponding side views of the tricycle in three different positions, from a position for personal transportation to a collapsed position,

Figure 6a shows the front part of the tricycle in closer detail,

Figure 6b is an enlarged detail of the connections of the rigid stay,

Figure 7a shows the front part of the tricycle seen from the rear,

Figure 7b shows a section of the guide structure,

Figure 8 shows the rear carriage seen from the front,

Figure 9 is a perspective view of the front part of the rear carriage,

Figure 10 is a side view of the tricycle in a position for personal transportation with the forces acting on the structure indicated,

Figure 11 shows the tricycle in a folded position, utilized as a wheeled briefcase or the like,

Figure 12 shows the vehicle carried as a backpack,

Figure 13 shows the vehicle utilized as a traditional scooter.

Detailed description of the invention

As shown in Figure 1, the invention relates to a tricycle 5, comprising a rear carriage 1, comprising at least one platform and at least one rear wheel 7, moveably arranged to a front part 2 via a rigid connection 3 and a stop face 9, a front part 2 comprising a support device 6 for a steerable front wheel 18, which support device 6 is provided with a guide structure 4 to facilitate folding of the tricycle. The front wheel might be turned through an angle of at least 180° and is fixed in a position in line or transverse to the rolling direction when the tricycle is folded. The rear carriage 1 is further provided with a handle 20 near the front of the platform, which enables folding of the tricycle by use of one hand.

The rear carriage 1 is designed generally as a U with two wheels 7 arranged at the rear ends. The wheels are arranged to abut the ground surface in different positions dependent of the position of the rear carriage 1. This is evident in Figure 8. The rear portion 16 of the carriage 1 where the rear wheels are attached is designed to support the tricycle 5 in folded and upright position, which renders it immobile if left in said position. If the folded tricycle is tilted backwards, the rear wheels 7 will be brought in contact with the ground and it can be wheeled as a wheeled

briefcase or the like. Due to the tricycle being tilted around a fixed point 16 on the rear carriage 1, this may be done by the use of one hand by applying a minimum moment of force.

The rear carriage 1 is connected to the front part of the tricycle via a rigid connection 3, which in the embodiment disclosed comprises a metal rod bent in the shape of an U with a straight stay 11 and an outward bent section 10 at each of the free ends of the U. The rigid connection 3 is pivotally arranged to a mid-section of the carriage 1 and to the lower part of the forward part 1, so that the carriage 1 can be folded towards the forward part 2 when the forward portion of the rear carriage 8 is lifted along the forward part.

Further, the rear carriage 1 is slidingly arranged in a guide 4, on the front part 2 of the tricycle, by two pegs 21 protruding towards each other engaging slots 22 in said guide 4. Generally, the guide is running from said stop face 9 to a position located higher on the support device and serves to guide the protruding part 8 of the carriage in respect to the support device 6 when the tricycle is collapsed or expanded.

The angle between the support device of the tricycle and the ground is sharp to provide an enhanced stability during steering and when the front wheel is in a transverse position.

In the personal transport position, the front part of the carriage 1 abuts a stop face 9 on the forward part 2. The stop face 9 shown in figure 6 and 7 comprises an upper edge 14 and sloping edges A and B on the forward part 2; the front part 8 of the carriage 1 is resting by abutment of corresponding facing sloping edges a and b on the stop face 9. The sloping edges A and B on the stop face 9 has angles

which exceed the angle of friction to avoid that the carriage and the forward part 2 get jammed.

The contact points A-a and B-b forms a quadrangle which carry moment of force between the parts in the transversal plane. The open u-shaped area of the front portion 8 of the carriage is guided over a transversal edge area 14 formed at the upper part of the stop face 9 of the front portion. To ensure that the forces are transferred via the sloping edges A-a and B-b, the carriage 1 abuts the stop face 9 with a close fit in the horizontal direction and with a slight clearance vertically from the upper edge area 14. The upper edge area 14 is substantially carrying forces in the horizontal direction which are caused by opposite directed tensible forces in the rigid connection 3. Fig 10 shows the forces in a rigid triangle formed by the locating points x, y, z.

The support device may comprise compartment units 23, so that the tricycle forms a wheeled briefcase or the like in a collapsed position. Further the tricycle may be equipped with carrying straps 24 to carry it like a backpack or a bag.

The main parts of the vehicle are made of metal, plastic or other substantially rigid materials.

Claims

1. A scooter (5) comprising a support device (6) for a steerable front wheel and a rear carriage (1) which is connected to the support device (6) at the front of the carriage (1), which carriage (1) is provided with at least one wheel (7) at the rear, the carriage (1) may be folded against the support device (6) to a compact unit which may be carried or rolled,
characterized in that the front of the said carriage (1), in a utilizing position, abuts a stop face (9) connected to the support device (6), and that a rigid stay (3) is arranged to the carriage (1), which stay (3) is pivotally arranged at its first end (10) to a mid-section of the carriage (1) and is pivotally arranged at its second end (11) to the support device (6), so that when the scooter is collapsed the carriage will pivot around the first end of the stay (3), so that the rear wheel or wheels are swung towards the front wheel.

2. A scooter according to claim 1,
characterized in that the support device (6) comprises a guide (4) which is running substantially from said stop face (9) to a position (12) higher on the support device (6), which guide (4) is guiding the front portion of the carriage (1) in respect to the support device (6) when the carriage (1) is folded towards and from the support device (6).

3. A scooter according to claim 1 or 2,
characterized in that the carriage (1) is comprising rear portions(16) protruding past the rear wheels (7), which rear portions (16) is serving as supporting points for the scooter when it is in a folded position.

4. A scooter according to claim 1 or 2,
characterized in that the stop face (9) comprises upward protruding edges (13), of which at least one

sloping edge (A, B) interacting with a corresponding sloping edge (a, b) in the front portion (8) of the carriage (1), wherein the angle of the sloped faces to the vertical preferably exceeds the angle of friction between the materials in the interacting sloped faces.

5. A scooter according to claim 4, characterized in that the stop face (9) comprises an upper edge area (14), which transfer substantially horizontal forces caused by tensible forces in said rigid stay (3), by abutment on a corresponding area (15) of the front portion of the carriage (1).

6. A scooter according to any of the preceding claims, characterized in that each of the rear wheels (7) comprise a rear and upper exposed area (17) which will act as the supporting members instead of the said rear portions (16) of the carriage as the scoter is folded and tilted, hence the scooter can be wheeled on its rear wheels.

7. A scooter according to any of the preceding claims, characterized in that units of compartment are arranged on the support device, and are available both in an unfolded position, during use as a scooter, and in folded position, when it is used as a wheeled briefcase or the like.

8. A scooter according to any of the preceding claims, characterized in that the front wheel can be turned through an angel of at least 180°.

9. A scooter according to any of the preceding claims, characterized in that the axis of revolution of the rear wheels generally is located above the platform of the carriage (1).

10. A scooter according to any of the preceding claims, characterized in that the scooter may be equipped with carrying straps (24) to carry it like a back-pack or a bag.

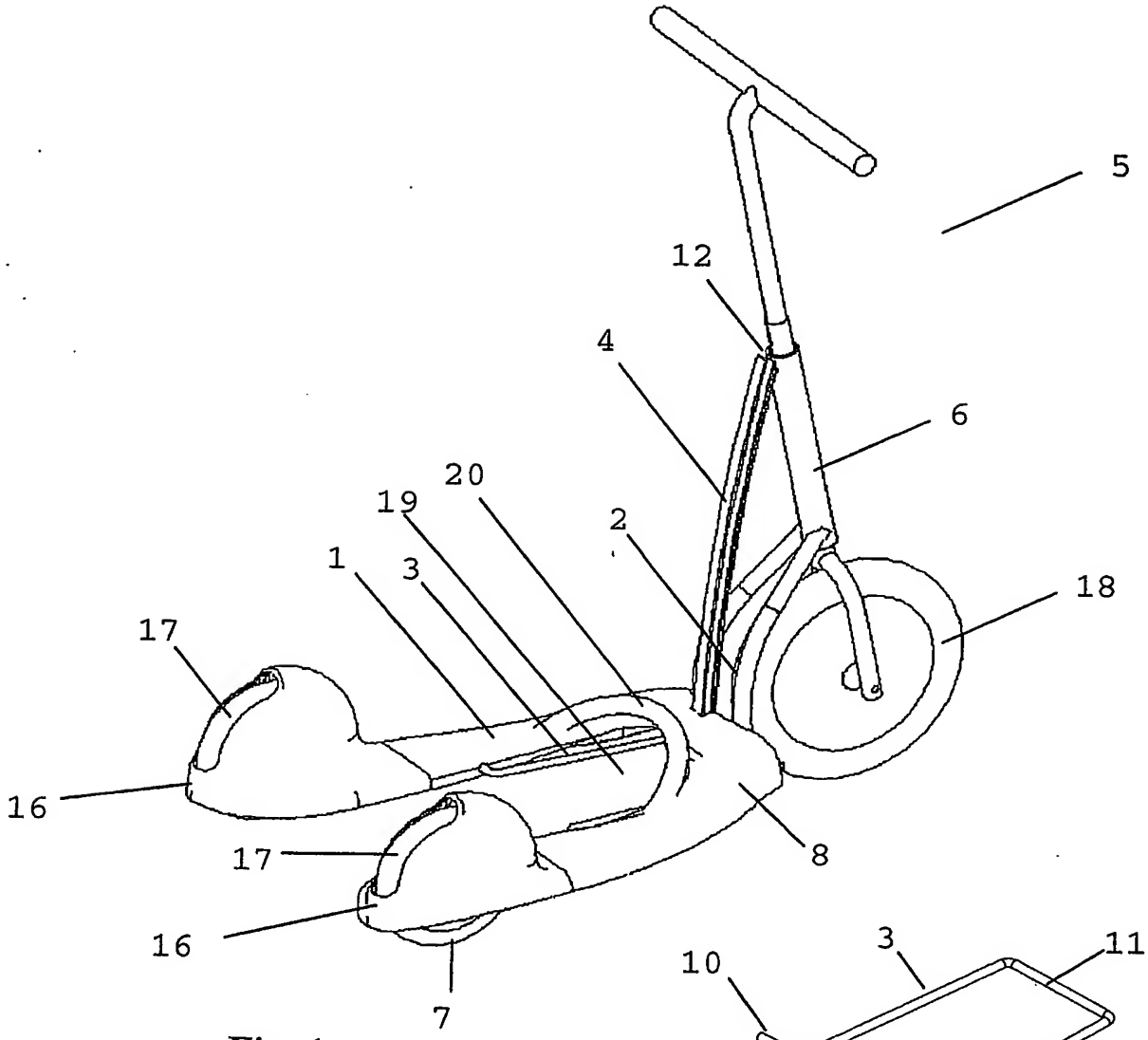


Fig. 1

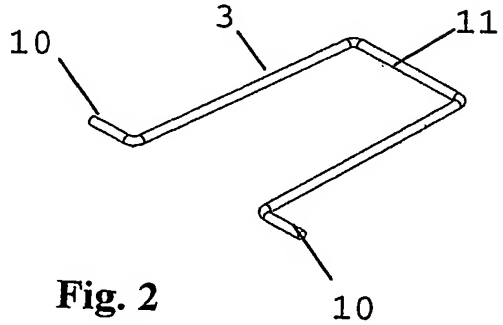


Fig. 2

Fig. 3

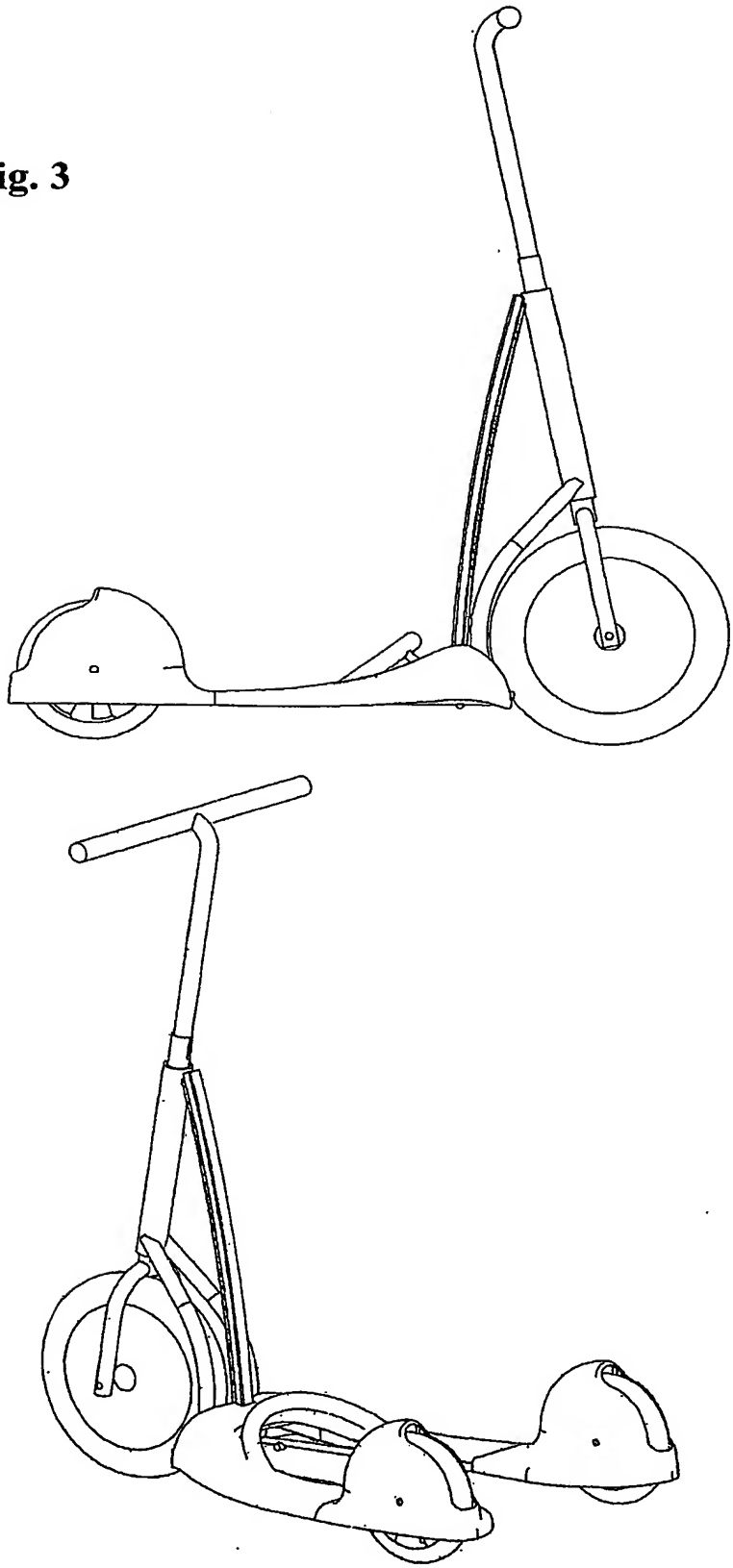


Fig. 4

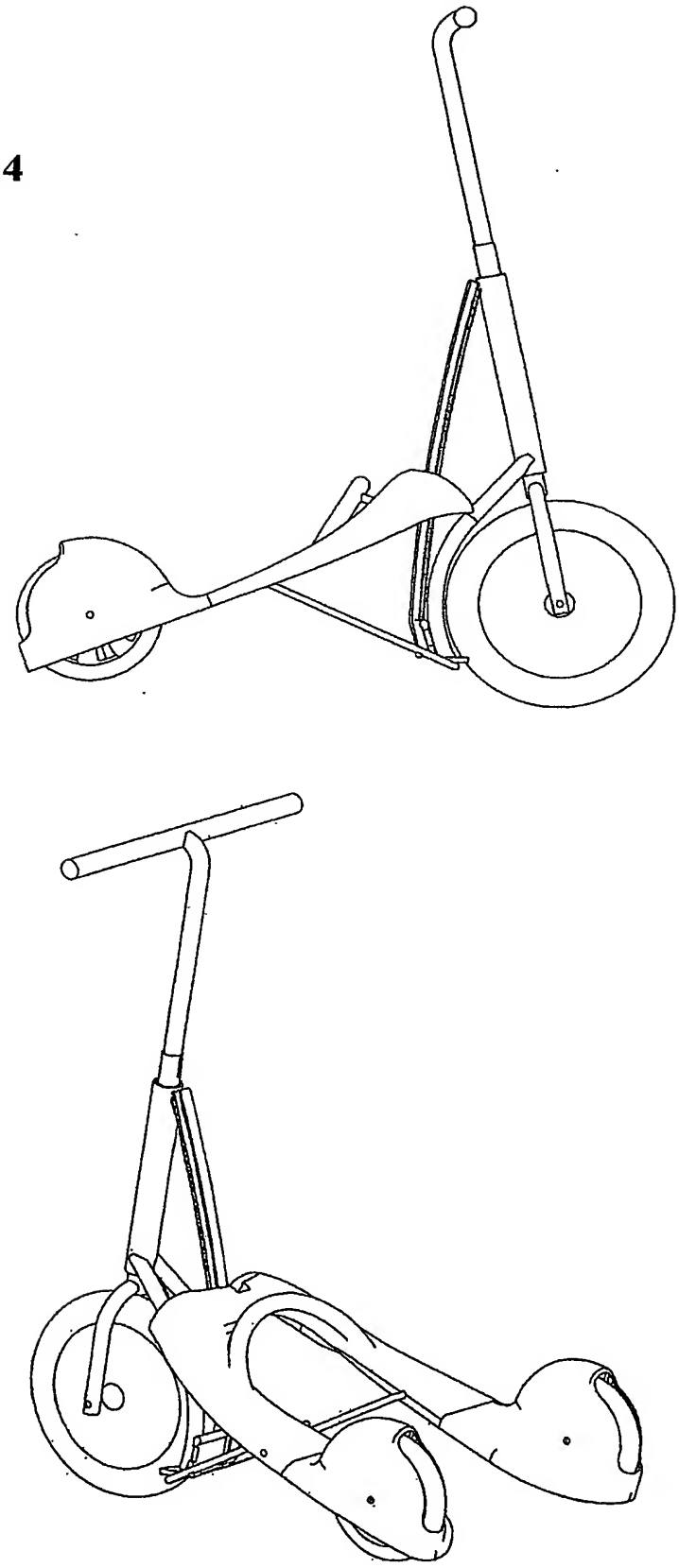


Fig. 5

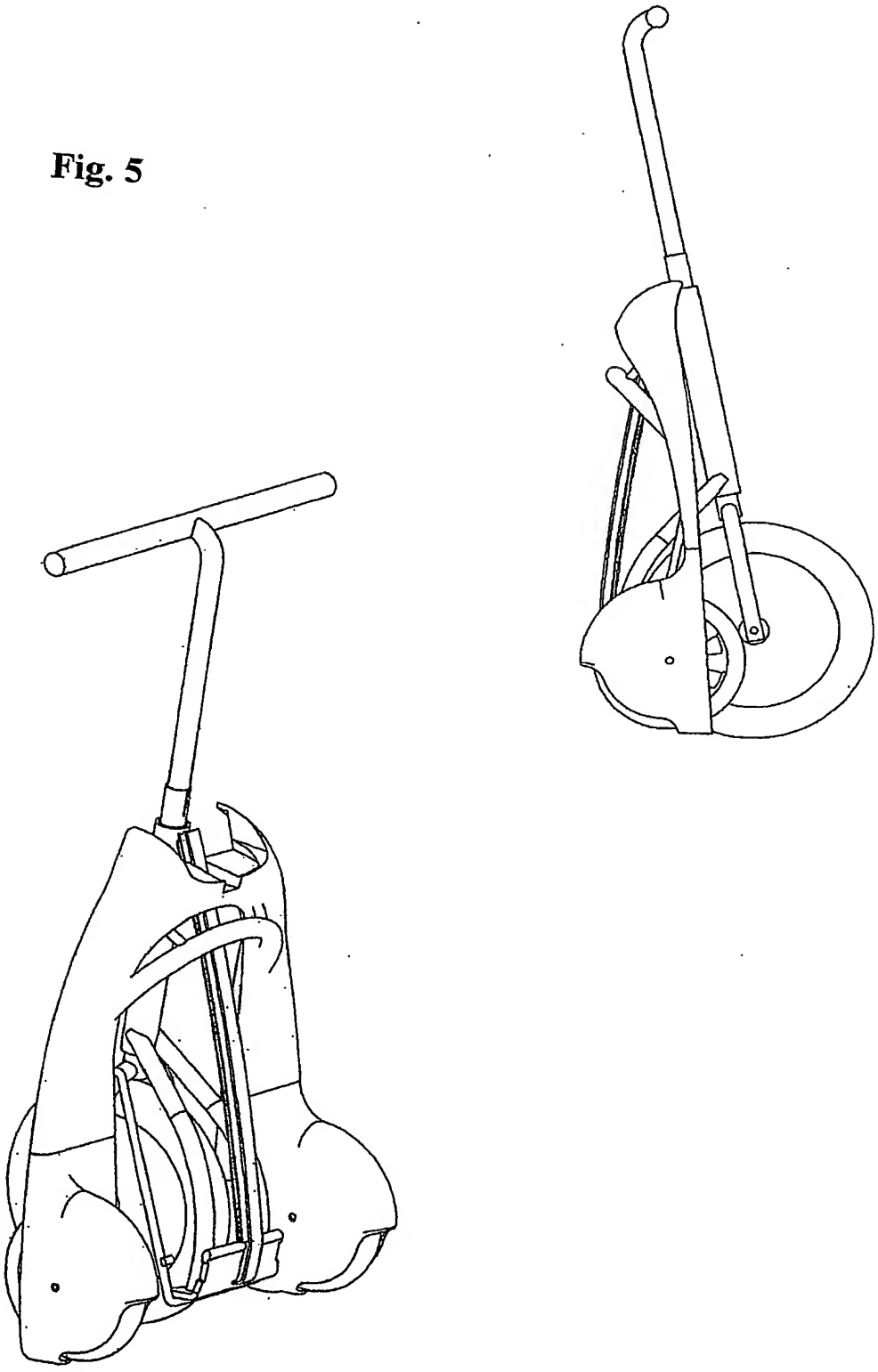
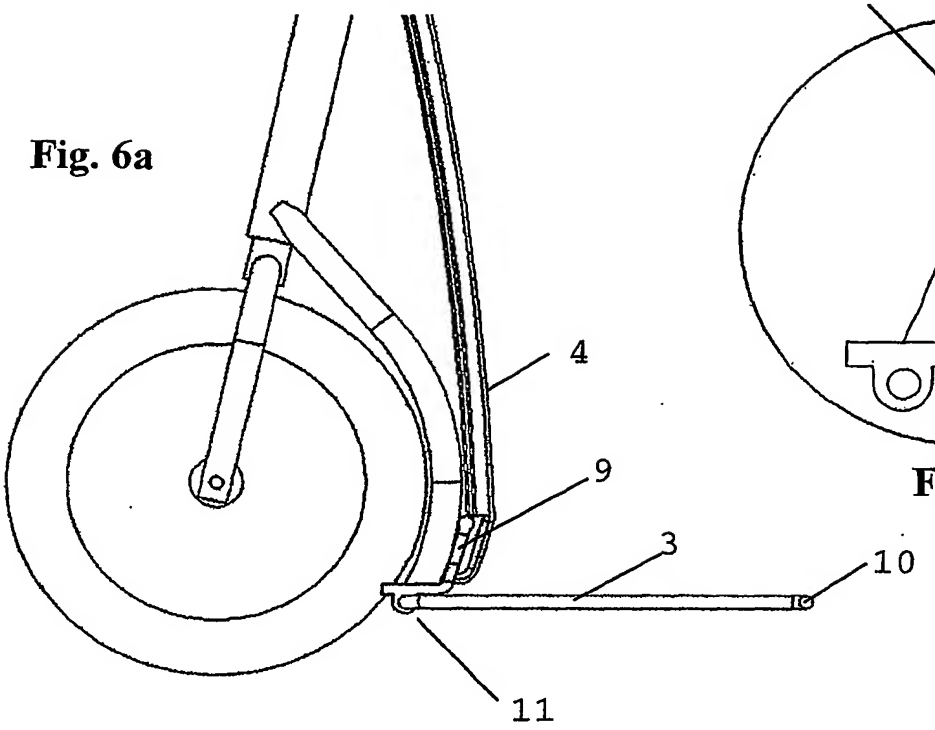


Fig. 6a



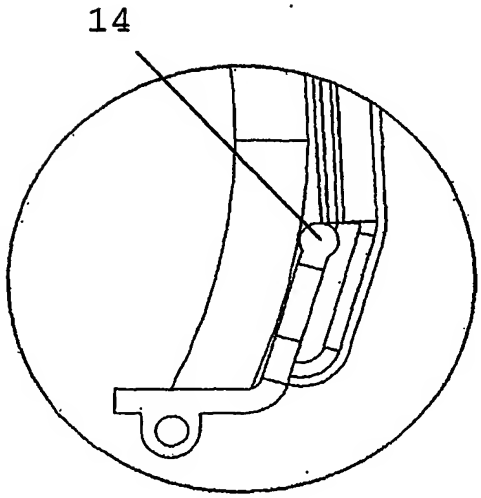


Fig. 6b

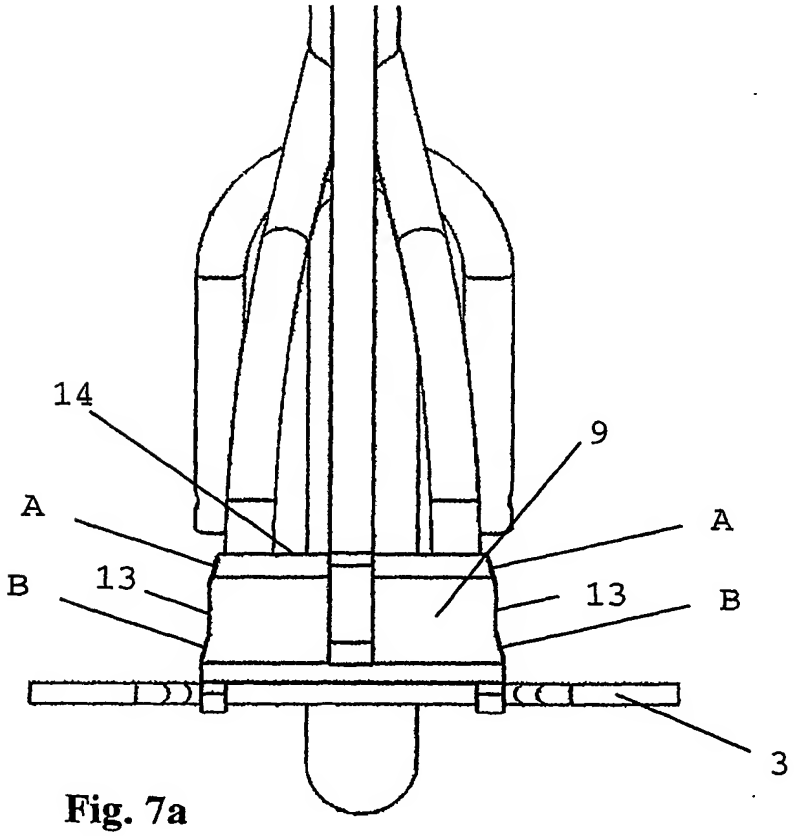


Fig. 7a

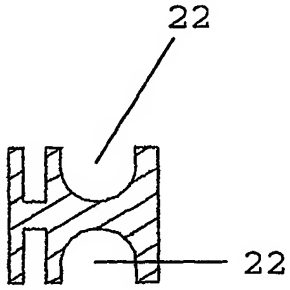


Fig. 7b

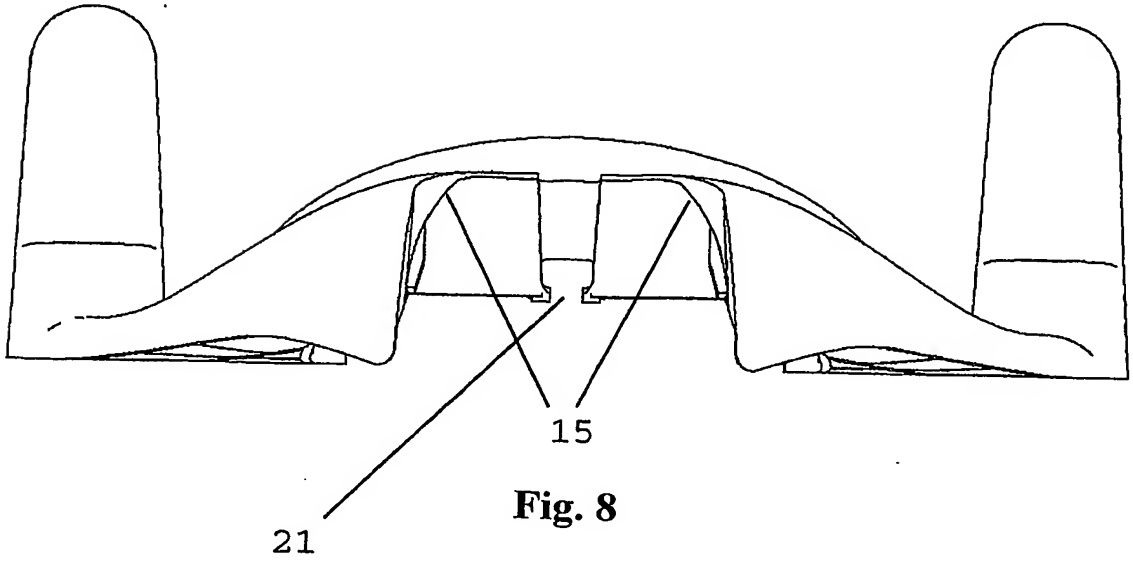


Fig. 8

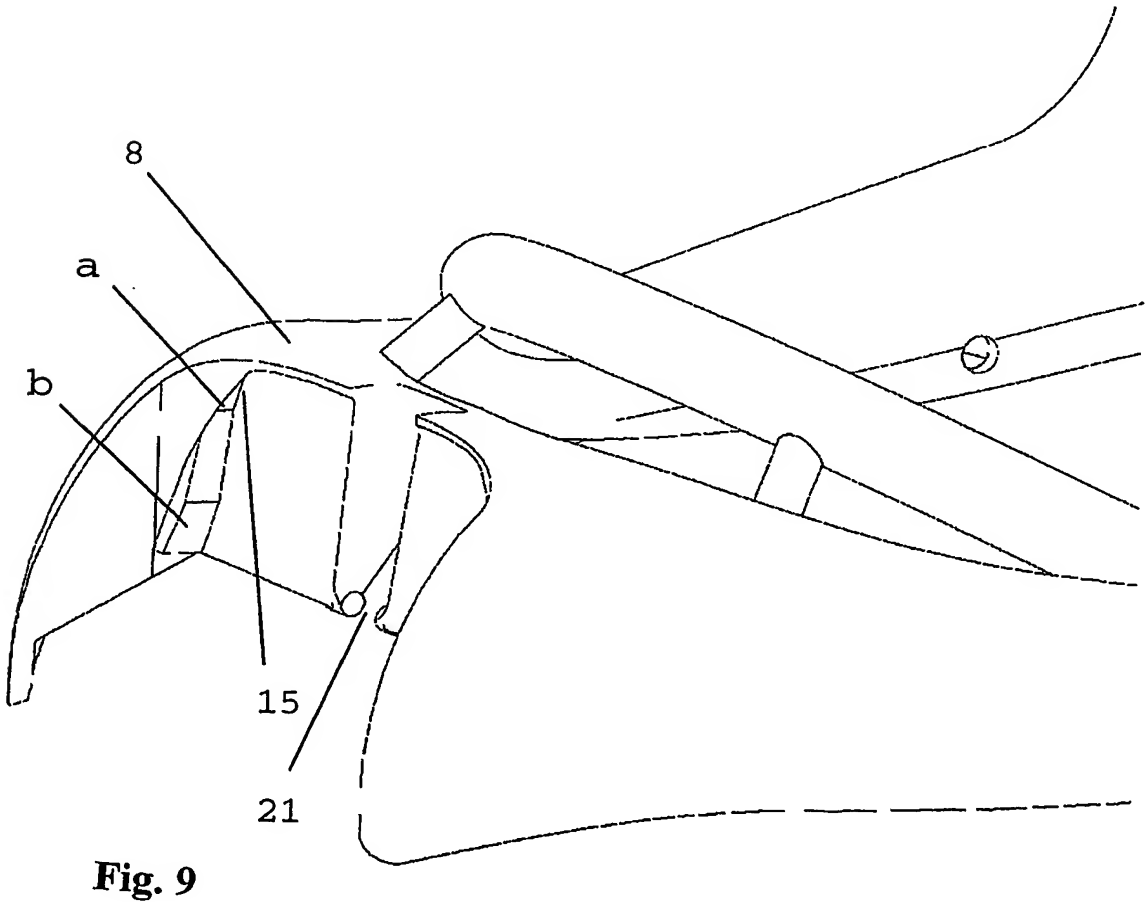


Fig. 9

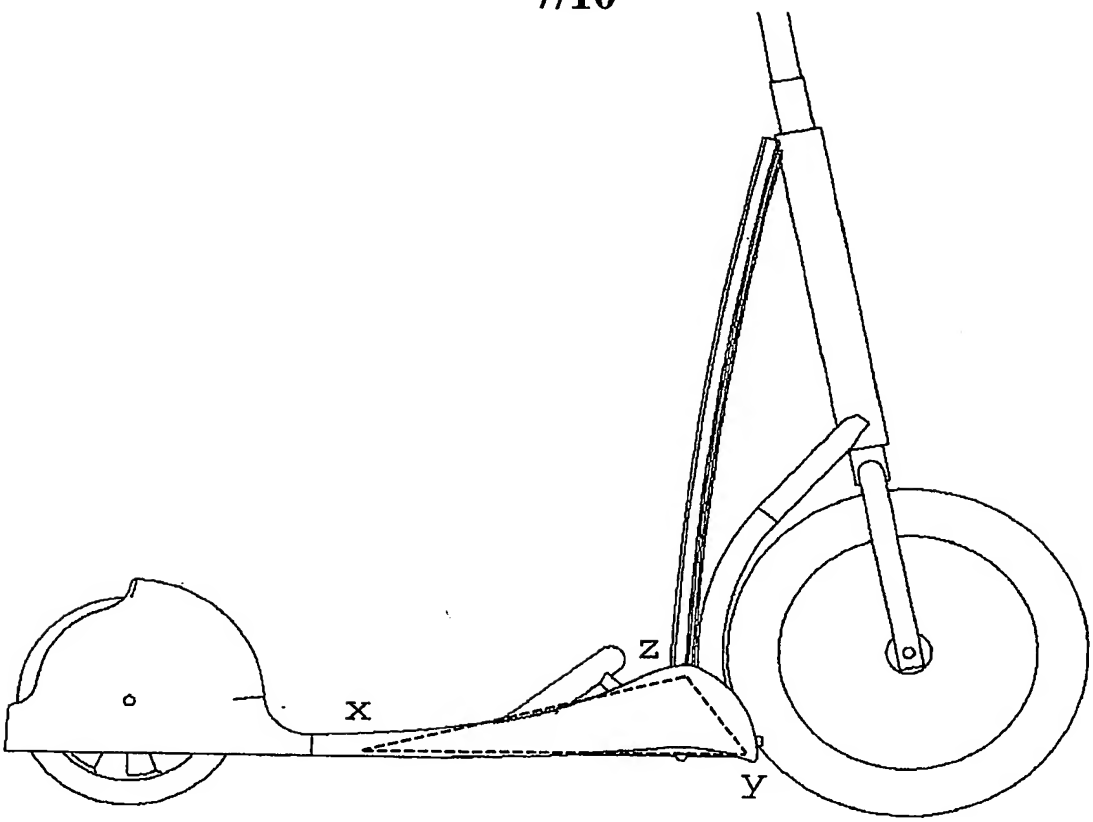


Fig. 10

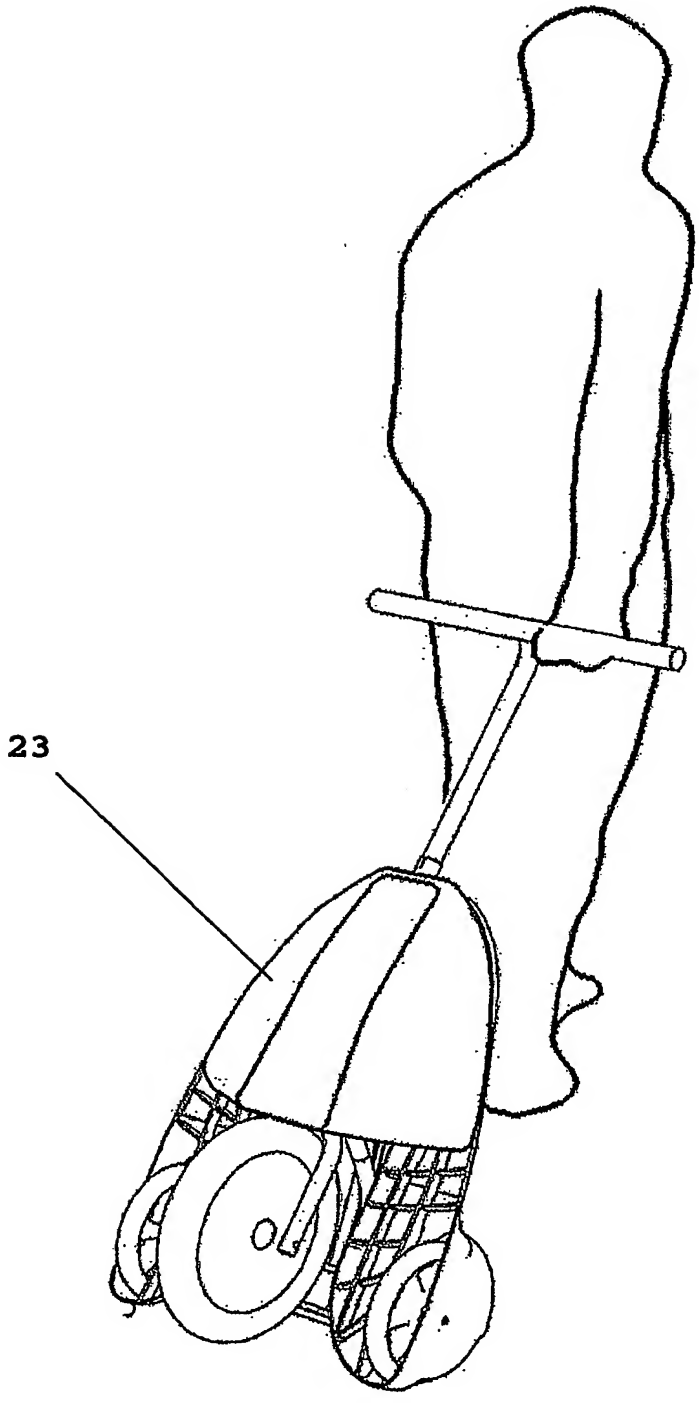


Fig. 11

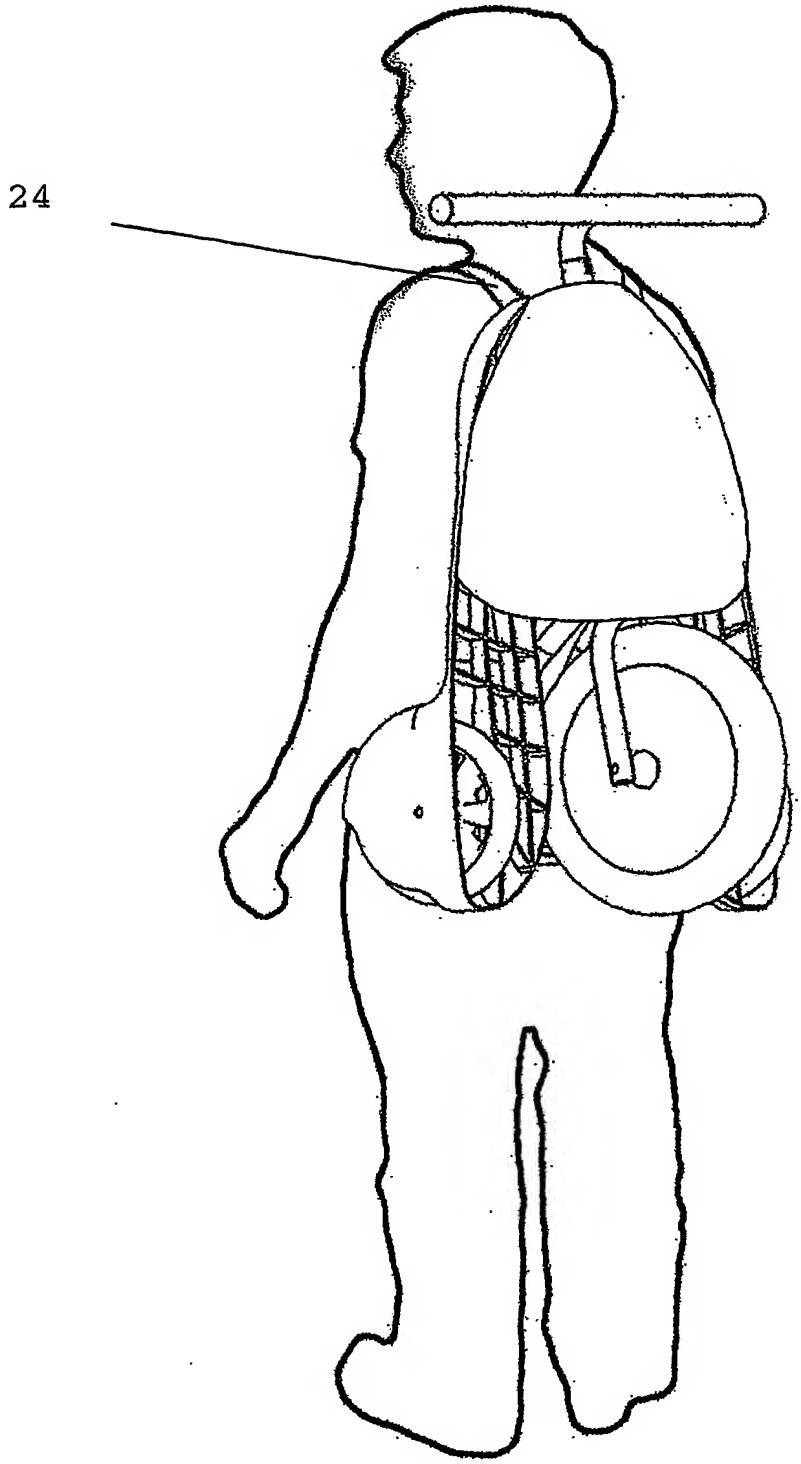


Fig. 12

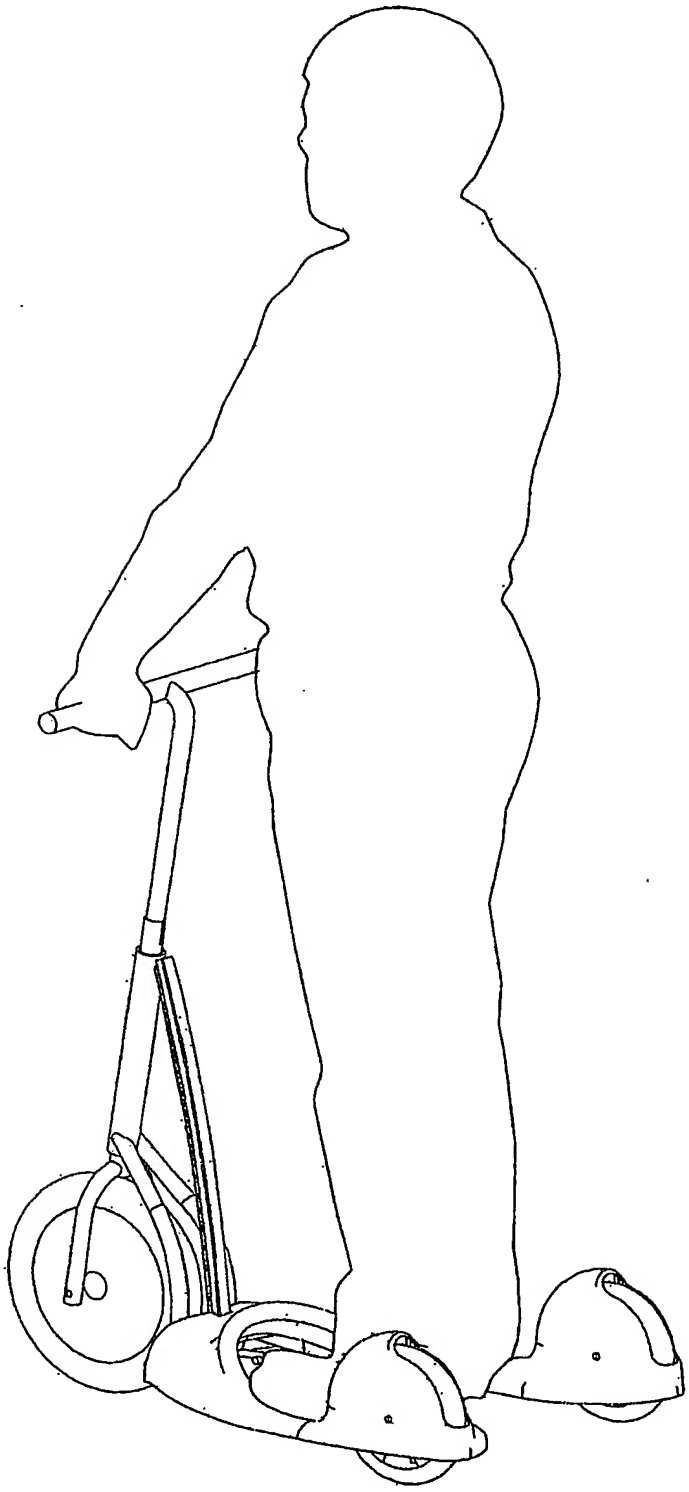


Fig. 13

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO 2003/000389

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B62K 15/00, B62K 5/04
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B62K, B62D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3434558 A (J F ALLEN), 25 March 1969 (25.03.1969), column 3, line 50 - column 4, line 16; column 5, line 12 - line 33, figures 2,5, 7	1,8,9
Y		9,10
	--	
Y	WO 9846474 A2 (EMPOWER CORPORATION), 22 October 1998 (22.10.1998), page 45, line 9 - line 33, figures 39,41	9
A		1-8,10
	--	

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
5 February 2004	16 -02- 2004
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Hans Nordström/EK Telephone No. +46 8 782 25 00

Form PCT/ISA/210 (second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO 2003/000389

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 0245539 A1 (UNIT S R L), 13 June 2002 (13.06.2002), page 17, line 12 - line 14, figure 44	10
A	--	1-9
A	EP 1213214 A2 (MELTON INTERNATIONAL L L C), 12 June 2002 (12.06.2002)	1-10
	--	
A	US 6220612 B1 (BELESKI JR), 24 April 2001 (24.04.2001)	1-10
	--	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/NO 2003/000389

US	3434558	A	25/03/1969	NONE		
WO	9846474	A2	22/10/1998	AU	6898998 A	11/11/1998
				EP	0973674 A	26/01/2000
				TW	391938 B	00/00/0000
WO	0245539	A1	13/06/2002	AU	1843402 A	18/06/2002
				IT	RN20000048 A	06/06/2002
EP	1213214	A2	12/06/2002	CN	2452567 U	10/10/2001
US	6220612	B1	24/04/2001	AU	3641301 A	14/05/2001
				CA	2390224 A	10/05/2001
				CN	1414918 T	30/04/2003
				EP	1235709 A	04/09/2002
				JP	2003532571 T	05/11/2003
				US	6499751 B	31/12/2002
				US	2003090076 A	15/05/2003
				WO	0132470 A	10/05/2001